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NATIONAL
GUIDELINE
CLEARINGHOUSE

General

Guideline Title

Central venous catheter care for the patient with cancer: American Society of Clinical Oncology clinical practice guideline.

Bibliographic Source(s)

Schiffert CA, Mangu PB, Wade JC, Camp-Sorrell D, Cope DG, El-Rayes BF, Gorman M, Ligibel J, Mansfield P, Levine M. Central venous catheter care for the patient with cancer: American Society of Clinical Oncology clinical practice guideline. *J Clin Oncol*. 2013 Apr 1;31(10):1357-70. [144 references] [PubMed](#)

Guideline Status

This is the current release of the guideline.

Recommendations

Major Recommendations

Clinical Question 1

In patients with cancer, does catheter type, insertion site, or placement affect complication rates?

Recommendation 1.1. There is insufficient evidence to recommend one type of central venous catheter (CVC) routinely for all patients with cancer. The choice of catheter should be influenced by the expected duration of use, the chemotherapy regimen, and the patient's ability to provide care. The minimum number of lumens essential for the management of the patient is recommended. These issues should be discussed with the patient.

Recommendation 1.2. There is insufficient evidence to recommend one insertion site or approach (left sided or right sided) for tunneled CVCs for patients with cancer. Individual risks and benefits (comfort, security, and maintenance of asepsis) of the catheter site should be considered. The Panel recommends that CVC insertion into the femoral vein be avoided because of increased infection risks and concerns about thrombosis, except in certain emergency situations.

Recommendation 1.3. Most CVC placement in patients with cancer is performed as an elective procedure. Although image-guided insertion (e.g., ultrasound-guided, fluoroscopy) of CVCs is recommended, well-trained providers who use the landmark method regularly (e.g., for subclavian or internal jugular) may have a high rate of success and a low incidence of acute and/or chronic complications.

Clinical Question 2

What is effective prophylaxis for the prevention of catheter-related infections?

Recommendation 2.1. A CVC care clinical bundle (including hand hygiene, maximal barrier precautions, chlorhexidine skin antisepsis during catheter insertion, optimal catheter site selection, and assessment of CVC necessity) is recommended for the placement and maintenance of all CVCs to prevent infections (see Table 2 in the original guideline document). There is no evidence that particular dressing types or more frequent intravenous (IV) set and/or dressing changes decrease the risk of infection. The use of topical antibiotic ointment or cream on insertion sites is not recommended because of the potential to promote fungal infections and resistance to antimicrobials. A scheduled guidewire exchange of CVCs may be associated with a greater risk of infection compared with catheter replacement at a new vascular site, and thus, guidewire exchange is not routinely recommended unless access options are limited.

Recommendation 2.2. The use of antimicrobial/antiseptic-impregnated or -coated CVCs (chlorhexidine and silver sulfadiazine [CH-SS] or minocycline/rifampin) and/or heparin-impregnated catheters is recommended to decrease the risk of catheter-related infections for short-term CVCs, particularly in high-risk groups such as bone marrow transplantation recipients or patients with leukemia. However, the relative benefit and increased cost must be carefully considered before they are routinely used.

Recommendation 2.3. The prophylactic use of systemic antibiotics (IV or oral) before insertion of a long-term CVC is not recommended.

Recommendation 2.4. There are conflicting data about the relative value of prophylactic heparin with saline flushes to prevent catheter-associated bloodstream infections (BSI) or thrombosis. Data are not sufficient to recommend for or against the routine use of antibiotic-flush/antibiotic-lock therapy.

Clinical Question 3

What are effective treatments for the management of catheter-related infections?

Recommendation 3.1. Cultures of blood from the catheter and when appropriate of soft tissues at the entrance-exit sites or tunnel should be obtained before the initiation of antibiotic therapy. Most exit- or entrance-site infections can be treated successfully with appropriate antimicrobial therapy without the need for catheter removal, although removal is usually needed for clinically apparent tunnel or port-site infections. Antimicrobial agents should be optimized once the pathogens are identified and antibiotic susceptibilities defined.

Immediate catheter removal is recommended for BSIs caused by fungi and nontuberculous mycobacteria (e.g., *Mycobacterium chelonae*, *M. fortuitum*, *M. mucogenicum*, *M. abscessus*). BSIs caused by *Bacillus* species, *Corynebacterium jeikeium*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Stenotrophomonas maltophilia*, and vancomycin-resistant enterococci may be difficult to eradicate with antimicrobial therapy alone, and early catheter removal should be considered. Catheter removal is also recommended for patients with an apparent tunnel or port-site infection, persistent bacteremia after 48 to 72 hours of appropriate antimicrobial treatment in the absence of other obvious sites or sources of infection, infective endocarditis or peripheral embolization, presence of local catheter-associated complications not responsive to treatment, or relapse of infection with the same pathogen after the completion of an appropriate course of antibiotics.

Clinical Question 4

What is effective prophylaxis for the prevention of catheter-related thrombosis?

Recommendation 4.1. The use of systemic anticoagulation (warfarin, low-molecular weight heparin [LMWH], or unfractionated heparin) has not been shown to decrease the incidence of catheter-associated thrombosis, and therefore, routine prophylaxis with anticoagulants is not recommended for patients with cancer with CVCs. Routine flushing with saline of the CVC to prevent fibrin buildup is recommended.

Recommendation 4.2. Data are insufficient to recommend routine use of urokinase (not currently available in the United States) and/or other thrombolytics to prevent catheter occlusion.

Clinical Question 5

What are effective treatments for the management of catheter-related occlusions?

Recommendation 5.1. The instillation of 2-mg tissue plasminogen activator (t-PA) is recommended to restore patency and preserve catheter function.

Recommendation 5.2. Although it is appropriate to try to clear a thrombosis with the CVC in place, if there is radiologically confirmed thrombosis that does not respond to fibrinolytic therapy or if fibrinolytic or anticoagulation therapy is contraindicated, catheter removal is recommended. Prolonged retention of an unneeded CVC can lead to significant problems associated with thrombosis and fibrosis. Three to 6 months of anticoagulant therapy with LMWH or LMWH followed by warfarin (international normalized ratio, 2.0 to 3.0) is recommended for the treatment of symptomatic CVC thrombosis, with the duration depending on clinical issues in individual patients.

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

- Cancer
- Catheter-related infection
- Catheter-related thrombosis

Guideline Category

Management

Prevention

Treatment

Clinical Specialty

Hematology

Infectious Diseases

Nursing

Oncology

Radiology

Surgery

Intended Users

Advanced Practice Nurses

Nurses

Physician Assistants

Physicians

Guideline Objective(s)

To develop an evidence-based guideline on central venous catheter (CVC) care for patients with cancer that addresses catheter type, insertion site, and placement as well as prophylaxis and management of both catheter-related infection and thrombosis

Target Population

Patients with cancer requiring the use of a long-term central venous catheter (CVC)

Interventions and Practices Considered

1. Consideration of catheter type, insertion site, and placement
2. Central venous catheter (CVC) care clinical bundle (hand hygiene, barrier precautions, chlorhexidine skin antisepsis, optimal site selection, assessment of CVC necessity)
3. Antimicrobial/antiseptic-impregnated or -coated CVCs
4. Cultures of blood from catheter and soft tissue before initiation of antibiotic therapy
5. Routine saline flush to prevent fibrin buildup
6. Installation of 2-mg tissue plasminogen activator (t-PA) to restore patency of occluded catheters
7. Anticoagulation therapy and catheter removal, if necessary, to treat symptomatic CVC thrombosis

Note: The following were considered but not recommended: prophylactic use of intravenous or oral systemic antibiotics before insertion of a long-term CVC and routine prophylaxis with anticoagulants. Data are not sufficient to recommend routine use of antibiotic-flush/antibiotic-lock therapy and routine use of urokinase and/or other thrombolytics to prevent catheter occlusion.

Major Outcomes Considered

- Infection rate
- Complication rate
- Quality of life

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Literature Search Strategy

MEDLINE (PubMed) and the Cochrane Collaboration Library were searched with the date parameters of January 1980 through January 2012. Reference lists of related reports and review articles were scanned for additional citations. Details about the literature search and results are provided in Data Supplements 3 and 4 at www.asco.org/guidelines/cvc .

Inclusion and Exclusion Criteria

The systematic review conducted for this guideline included 108 randomized controlled trials (RCTs) in which adult or pediatric patients with cancer were randomly assigned to an appropriate control group or to an intervention of interest, including central venous catheter (CVC) type, placement site, or strategies to prevent or manage infection or thrombosis. Studies were included only if they had catheter type, placement site, infection, or thrombosis as a priori planned primary or secondary outcome and described a method of regular patient follow-up to ensure a consistent and identical identification of the outcomes in both study arms. Infection and/or thrombosis had to be confirmed either through objective tests (blood or imaging) and/or clinical observation. Results of meta-analyses are also reported in the Literature Review and Analysis sections pertaining to each recommendation; other guidelines, particularly those by the Centers for Disease Control and Prevention (CDC), originally published by the CDC in August 2002 and updated in 2011, and the Infectious Disease Society of America (IDSA), informed the decisions of the Panel.

Trials were excluded if they were nonrandomized reports or posthoc subgroup analyses or if only a minority of the patients studied had cancer. RCTs were also excluded if patients with CVCs were compared with patients with peripheral catheters.

Number of Source Documents

A total of 108 randomized controlled trials with results specific to patients with cancer (see Data Supplement 1 at www.asco.org/guidelines/cvc) , 25 meta-analyses or systematic reviews (see Data Supplement 2 at www.asco.org/guidelines/cvc) , and several existing guidelines were identified in the search of the literature.

Methods Used to Assess the Quality and Strength of the Evidence

Expert Consensus

Rating Scheme for the Strength of the Evidence

Not applicable

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Data Extraction

Two reviewers independently extracted the data on basic study design, patient characteristics, interventions, study outcomes, follow-up, and measures of study quality. Any discrepancies between reviewers were resolved by consensus.

Study Quality

Overall study quality was evaluated by the Jadad method. The evidence tables in Data Supplements 1 and 2 at www.asco.org/guidelines/cvc include information on randomization, blinding, allocation concealment, withdrawals, and intention-to-treat analyses. Meta-analyses were evaluated using the Oxman-Guyatt Index, in which questions must be clearly specified, target populations identified and accessed, and appropriate information obtained in an unbiased fashion.

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Panel Composition

The American Society of Clinical Oncology (ASCO) Clinical Practice Guidelines Committee convened an Expert Panel consisting of experts in clinical medicine and research relevant to central venous catheter (CVC) care in patients with cancer, including medical and surgical oncologists and oncology nurses. Academic and community practitioners and a patient representative were also part of the Panel.

Evidence-Based Guideline Development Process

The entire Panel met one time in person and a writing group met subsequently; additional work on the guideline was completed through a steering group and e-mail. The Panel and writing group drafted guideline recommendations and distributed writing assignments. All members of the Panel participated in the preparation of the draft guideline document, which was then disseminated for review and approval by the entire Panel.

Rating Scheme for the Strength of the Recommendations

Not applicable

Cost Analysis

The guideline developers reviewed published cost analyses.

Method of Guideline Validation

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

The guideline was submitted to *Journal of Clinical Oncology* for peer review. Feedback from additional external reviewers was also solicited. The content of the guideline and the manuscript was reviewed and approved by the American Society of Clinical Oncology (ASCO) Clinical Practice Guideline Committee before publication.

Clinical Practice Guideline Committee Approved: September 5, 2012.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of evidence supporting the recommendations is not specifically stated.

Refer to the "Literature Review and Analysis" sections of the original guideline document for specific evidence for each recommendation.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Appropriate central venous catheter care for patients with cancer

Potential Harms

- Early complications related to central venous catheter (CVC) placement include bleeding, cardiac arrhythmia, malposition, air embolism, and pneumothorax and, rarely, injury to vessels or nerves. Late complications include infection, thrombosis, and catheter malfunction.
- Complications of tunneled catheters may include infection or bleeding at the entrance-exit site or in the subcutaneous tunnel, blood clots in or around the catheter, lung collapse during insertion, and catheter occlusion.
- Complications of implanted catheters may include infection of the port site or catheter, blood clots in or around the catheter, lung collapse during insertion, and catheter occlusion.
- Disadvantages of peripherally inserted central catheters include more frequent flushing and dressing changes. Complications may include infection at the exit site, blood clots in or around the catheter, and catheter occlusion.

Qualifying Statements

Qualifying Statements

Guideline Policy

The practice guideline is not intended to substitute for the independent professional judgment of the treating physician. Practice guidelines do not account for individual variation among patients and may not reflect the most recent evidence. This guideline does not recommend any particular product or course of medical treatment. Use of the practice guideline is voluntary.

Limitations of the Literature

It should be noted that many of the trials had small numbers of patients, and there was considerable heterogeneity in trial design, types of catheters used, placement techniques, and methods of evaluating end points, even among trials addressing the same question. In addition, clinical practices have changed over the years, and the Panel focused on more-recent trials whenever possible. Nonetheless, the overall quality of the evidence was rated as good, as evidenced in part by the consistency among meta-analyses and guidelines compiled by other groups.

Implementation of the Guideline

Description of Implementation Strategy

For information on the American Society for Clinical Oncology (ASCO) implementation strategy, please see the [ASCO Web site](#)

Implementation Tools

Patient Resources

Resources

Slide Presentation

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Living with Illness

Staying Healthy

IOM Domain

Effectiveness

Patient-centeredness

Safety

Identifying Information and Availability

Bibliographic Source(s)

Schiffer CA, Mangu PB, Wade JC, Camp-Sorrell D, Cope DG, El-Rayes BF, Gorman M, Ligibel J, Mansfield P, Levine M. Central venous catheter care for the patient with cancer: American Society of Clinical Oncology clinical practice guideline. *J Clin Oncol*. 2013 Apr 1;31(10):1357-70. [144 references] [PubMed](#)

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2013 Apr 1

Guideline Developer(s)

American Society of Clinical Oncology - Medical Specialty Society

Source(s) of Funding

American Society of Clinical Oncology

Guideline Committee

CVC Care Panel

Composition of Group That Authored the Guideline

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Financial Disclosures/Conflicts of Interest

The Expert Panel was assembled in accordance with the American Society for Clinical Oncology (ASCO) Conflicts of Interest Management Procedures for Clinical Practice Guidelines (summarized at www.asco.org/guidelinescoi).

The author(s) indicated no potential conflicts of interest.

Guideline Status

This is the current release of the guideline.

Guideline Availability

Electronic copies: Available in Portable Document Format (PDF) from the [American Society of Clinical Oncology \(ASCO\) Web site](#) .

Print copies: Available from American Society of Clinical Oncology, Cancer Policy and Clinical Affairs, 2318 Mill Rd, Suite 800, Alexandria, VA 22314; E-mail: guidelines@asco.org.

Availability of Companion Documents

The following are available:

- Central venous catheter care for the patient with cancer: American Society of Clinical Oncology clinical practice guideline. Data supplement. Alexandria (VA): American Society of Clinical Oncology; 2013. 44 p. Electronic copies: Available in Portable Document Format from the [American Society of Clinical Oncology \(ASCO\) Web site](#) .
- Central venous catheter care for the patient with cancer: American Society of Clinical Oncology clinical practice guideline. Slide set. Alexandria (VA): American Society of Clinical Oncology; 2013. 30 p. Electronic copies: Available in [PDF](#) and [PowerPoint](#) format from the ASCO Web site.

American Society of Clinical Oncology, Cancer Policy and Clinical Affairs, 2318 Mill Rd, Suite 800, Alexandria, VA 22314; E-mail: guidelines@asco.org.

Patient Resources

The following is available:

- Catheters and ports in cancer treatment. Electronic copies: Available from the [Cancer.net Web site](#) .

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

NGC Status

This NGC summary was completed by ECRI Institute on April 12, 2013. This summary was updated by ECRI Institute on March 6, 2014 following the U.S. Food and Drug Administration advisory on Over-the-Counter Topical Antiseptic Products. This summary was updated by ECRI Institute on March 10, 2014 following the U.S. Food and Drug Administration advisory on Low Molecular Weight Heparins.

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